THEORY OF COMPUTATION

1. Based on the accepting power, which of the following is true?

(a) Type 0 ⊂ Type 1 ⊂ Type 2 ⊂ Type 3
(b) Type 0 ⊂ Type 2 ⊂ Type 1 ⊂ Type 3
(c) Type 0 ⊃ Type 1 ⊃ Type 2 ⊃ Type 3
(d) Type 0 ⊃ Type 2 ⊃ Type 1 ⊃ Type 3

2. Which of the following is true?

(i) Automata is a recognizing device or an accepting device.
(ii) Grammar is a generating device.

(a) only (i)
(b) only (ii)
(c) both (i) & (ii)
(d) none of these

3. Expressive power of automata is the number of languages accepted by the automata. What is the expressive power of Finite Automata(FA), Push Down Automata(PDA), Linear Bounded Automata(LBA) and Turing Machine(TM), respectively.

(a) FA – 1, PDA – 1, LBA – 1, TM – 1
(b) FA – 1, PDA – 2, LBA – 3, TM – 4
(c) FA – 4, PDA – 3, LBA – 2, TM – 1
(d) FA – 1, PDA – 4, LBA – 3, TM – 2

4. Which of the following is/ are true about expressive power of automata?

(i) E(DFA) = E(NFA)
(ii) E(DPDA) ≠ E(NPDA)
(iii) E(DTM) = E(NTM)

(a) Only (i) & (iii)
(b) Only (i) & (ii)
(c) Only (ii) & (iii)
(d) All are true

5. For which of the following language L, modes can be constructed in both deterministic and non-deterministic mode to accept L?

(i) Regular Language
(ii) Context free Language
(iii) Recursive Enumerable Language

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(a) Only (i) & (ii)
(b) Only (i) & (iii)
(c) Only (ii) & (iii)
(d) All of the above

6. Which of the following statements is/are true about the automata?

(i) DFA is more efficient but less powerful than NFA
(ii) DPDA is more powerful but less efficient than NPDA
(iii) DTM is more efficient but less powerful than NTM

(a) (i), (ii) & (iii)
(b) Only (i) & (ii)
(c) Only (ii) & (iii)
(d) Only (i) & (iii)

7. Which of the following statements is false?

(a) DFA & NFA are of same capability
(b) DPDA & NPDA are of same capability
(c) DTM & NTM are of same capability
(d) None

8. Which of the following statements is wrong?

(a) PDA is more powerful than FA
(b) TM is more powerful than PDA
(c) FA+3Stacks is more powerful than FA+2Stacks
(d) None

9. Let (u, w) be the two strings defined over an alphabet Σ. Which of the following is true?

(i) If it is a substring of w then $|u| \leq |w|$
(ii) Every string is substring to itself
(iii) Empty string ε is a substring of every string

(a) Only (i) & (iii)
(b) Only (ii) & (iii)
(c) Only (i) & (ii)
(d) All of the above

10. Given $\Sigma = \{A - Z, 0 - 9\}$ be an alphabet where w is a string defined over the alphabet. Let w = GATE2016, then number of substrings and number of trivial substrings is:

(a) 37, 39
(b) 37, 32

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(c) 39, 37 (d) 12, 37

11. Given a string w = "GRAMMAR", the number of prefixes & suffixes respectively are:

(a) 7, 7 (b) 8, 8
(c) 7, 8 (d) 8, 7

12. Given $\Sigma = \{a, b\}$, which of the following statement is true?

(i) $\Sigma^* \cup \Sigma^+ = \Sigma^+$
(ii) $\Sigma^* \cap \Sigma^+ = \Sigma^*$
(iii) $\Sigma^* \cdot \Sigma^+ = \Sigma^+ \cdot \Sigma^* = \Sigma^+$
(iv) $\Sigma^+ \cdot \Sigma^+ = \Sigma^+$

(a) Only (i), (ii) & (iii) (b) Only (i), (ii) & (iv)
(c) Only (iii) & (iv) (d) All of the above

13. Consider the following statement about the language.

Which of the following is true?

(i) The language which does not contain even an empty string is called an empty language.
(ii) 'C' language is a finite language.
(iii) The language which contains finite number of strings whose length is infinite is known as infinite language.
(iv) Empty language ϕ is a finite language.

(a) Only (i) & (ii) are false (b) Only (ii) is false
(c) Only (iii) is false (d) Only (iii) & (iv) are false

14. Which of the following statement is true?

(i) Empty language ϕ is a finite language
(ii) The language containing only empty string ε is always Non-empty language
(iii) Empty language ϕ is a regular language
(iv) Every finite language is regular language

(a) Only (i) & (ii) are true (b) Only (i), (iii) & (iv) are true

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(c) Only (ii) & (iv) are true

(d) All are true

15. Which one of the following is/are the Finite Automata with outputs?

(a) DFA

(b) NFA

(c) ∈-NFA

(d) Moore m/c

(e) Mealey m/c

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